Reprinted from
Missouri Conservationist

Missouri's Eagles, Hawks, Falcons & Vultures

Prairie Falcon Brian Toland

Bald eagle Jim Rathert

The Eagle

He clasps the craig with hooked hands,
Close to the sun in lonely lands;
The wrinkled sea beneath him crawls;
Ring'd with the azure world, he stands,
He watches from the mountain walls,
And like a thunderbolt he falls.

Alfred, Lord Tennyson

By Brian Toland
Columbia

Illustration by David J. Huth

EAGLES and their relatives, the hawks and falcons, have long been a source of wonder. The golden eagle's mastery of the wind, the piercing eyes of a Cooper's hawk on its kill, the baleful glare of a hunting red-tailed hawk or the tremendous speed of a peregrine in full stoop have intrigued falconers and inspired poets. Their regal appearance and haughty manner have made them the emblems of kings and empires. Now, as their numbers decline and as some species seem destined toward extinction, man's regard for the magnificent birds of prey is tinged with concern for their survival.

Those raptors which are active during daylight belong to the Order Falconiformes, a group which originated about 75 million years ago. At one time they were considered closely related to the nocturnal raptors, the owls. Better understanding of differences in anatomy, physiology and behavior, however, show that the two orders are not closely related. Their similarities are the result of parallel evolution whereby similar structures evolved in unrelated animals adapting to similar life styles.

The Order Falconiformes comprises 290 species world-wide. Of the 33 in North America, 19 can occur in Missouri. Our birds of prey vary enormously in size, from the bald eagle—which can weigh as much as 15 pounds and have a six- to eight-foot wingspan—to the tiny American kestrel, which weighs only three or four ounces.

Raptors have evolved to perform certain basic functions from their ecological positions at the top of food chains. As Aldo Leopold noted, with typical poignancy: "The hawk, as a lethal agent, is the perfect flower of that still utterly mysterious alchemy—evolution. No man-made machine can, or ever will, synthesize that perfect coordination of eye, muscle and pinion as he stoops to his kill." In general, birds of prey remove the old, young, sick or surplus individuals of small- or medium-sized animals with high reproductive capabilities. By removing the inferior individuals from a population of prey species, raptors help control the numbers of these animals, maintaining them at levels that best can be supported by an area of land, and ensuring that only the strong, healthy animals pass genes on to their progeny.

Because birds of prey are at the top of food chains, generally large and easily observable, they are excellent indicators of ecological diversity and environmental health. Abundance and variety of raptors in a given area demonstrate the presence of a healthy assortment of plants and animals on which they ultimately depend for survival. Thus, habitats managed for raptors benefit countless other wildlife species as well.

These majestic birds live in every type of habitat, from mountains to plains and from dense forest to farmland. Because the various kinds of eagles, hawks, falcons and vultures have different feeding habits, they have developed different styles of flight—flapping, gliding, hovering, soaring and diving. They are among the most spectacular fliers of the entire bird world.

Raptors share several physical characteristics, including exceptionally keen eyesight, a sharp, hooked beak for tearing flesh, and strong, grasping feet with large, sharp talons for killing and holding prey. Only the vultures have weak feet.

The size and curvature of the talons, as well as the length of the toes, varies according to the type of prey. Bird-hunters such as sharp-shinned hawks have long, thin toes, while mammal-eaters like red-tailed hawks possess shorter, thick, powerful toes. The legs of most species are protected by rough scales. Bald eagles and ospreys have sharp, needlelike scales on their feet, which help them get a firmer grip on their fish prey.

The bills also vary in relation to food preferences, but to a lesser degree than the feet. The hooked beak typically is only used to pull apart prey already killed by the feet and is rarely used for defense. Anyone who has handled live hawks knows that it is the feet that are dangerous. In falcons and some insect-eating kites, the upper mandible has a notch in the edge which is used to sever the spinal cord of prey.

The raptors' vision may well be the keenest of any living creatures. The unparalleled resolving power of eagles, hawks and falcons comes partly from their large, rounded eyeballs. A red-tailed hawk's eyes are nearly as large as a human's, though the bird may weigh only three pounds. Such size results in a relatively large image cast upon the retina. The retinas have a dense concentration of cones and a great many optic nerve fibers. The area of critical focus, known as the fovea, in the back of a hawk's eye has 1,000,000 visual cells or cones per square millimeter, compared to 200,000 in a human eye. Even more impressive, the hawk's eye has two foveas in the retina where the highest concentration of visual cones occur, while we have but one. Thus raptors can see eight times better than man and have an exceptional ability to judge distance.

The fierce expression characteristic of raptors results from a projecting, bony shield above each eye. This shield helps protect the eye from tree limbs and brush when the birds are in pursuit of dodging, feinting prey. It also shades the eye from the sun's glare and from damage due to struggling prey or clumsy feeding attempts by overzealous nestlings.

In many of the Falconiformes, the female is larger than the male. This difference is greatest in the more aggressive species—the larger falcons, accipiters and eagles—and is less pronounced among the kites, kestrels, vultures and those hawks which feed on insects, rodents, reptiles or carrion. The term *tiercel* denotes a male falcon. It derives from the Latin *tertius* meaning "third." Males often are that much smaller than their mates. Indeed, in some species the female can be nearly twice as large.

Most Falconiformes nest in relatively high, inaccessible locations in trees or on cliffs, though some, like the northern harrier, nest on the ground. Hawks and eagles build stick nests, while falcons dig a shallow scrape for their eggs on a cliff ledge, in a tree cavity or in a nest of

Many raptors, like this red-tailed hawk, attack from a long, shallow dive so as not to alert their prey.

Brian Toland

Eagles, Hawks, Falcons & Vultures of Missouri

Field observation of hawks is often just impressions of light and dark markings on the birds as they pass overhead. The birds on this page are shown in relative size, with wingspread and length of adults in inches.

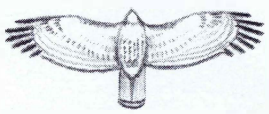
Merlin
W-25'' L-12''

Peregrine Falcon
W-40'' L-18''

Cooper's Hawk
W-32'' L-17''

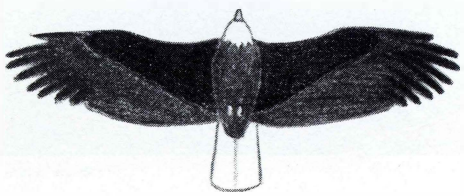
Northern Harrier (Marsh Hawk)
W-42'' L-20''

Red-tailed Hawk
W-50'' L-18''



Swainson's Hawk
W-52'' L-20''

Bald Eagle
W-80'' L-32''

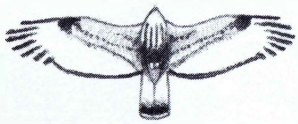


Northern Goshawk
W-42'' L-24''

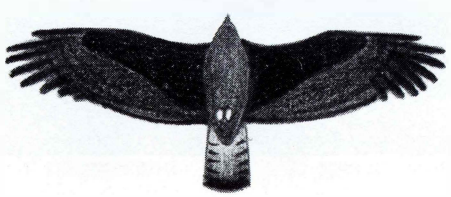
Osprey
W-65'' L-22''

Red-shouldered Hawk
W-40'' L-19''

Northern Rough-legged Hawk
W-56'' L-22''



Golden Eagle
W-85'' L-35''



American Kestrel
W-22'' L-10''

Prairie Falcon
W-40'' L-16''

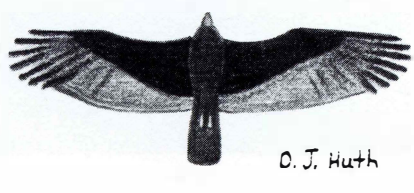
Sharp-shinned Hawk
W-24'' L-13''

Mississippi Kite
W-36'' L-14''

Broad-winged Hawk
W-33'' L-16''

Black Vulture
W-60'' L-22''

Turkey Vulture
W-72'' L-27''



Vultures are normally shy of people, but this immature turkey vulture was camera tolerant. Don Wooldridge

another bird. Vultures lay their eggs on the ground inside a cave, log or tree.

The larger species are potentially long-lived. There are many examples of large vultures and eagles living 30, 40, even 50 years. Probably the oldest bird in Missouri is a 47-year-old male golden eagle residing at the Raptor Research and Rehabilitation Project at Tyson Research Park near St. Louis. In the wild, the life span of these great birds usually is much shorter, frequently attributable to man.

Birds of prey have been seriously threatened by man's activity for much of this century. Major factors contributing to the decline of raptors include indirect and direct persecution, pesticide poisoning and habitat loss.

Indirect persecution results from the unwitting violation of a raptor's need for solitude, especially during the nesting season. Direct persecution involves shooting, poisoning and trapping—widespread in the 1950s and '60s. Though all birds of prey now are protected by state and federal laws, shooting remains a significant problem in many states. It appears to have declined in Missouri due to a growing appreciation for conservation, although as late as 1977, 17 bald eagles were shot in our state within a four-month period. Open, baited traps intended for other animals also pose a problem.

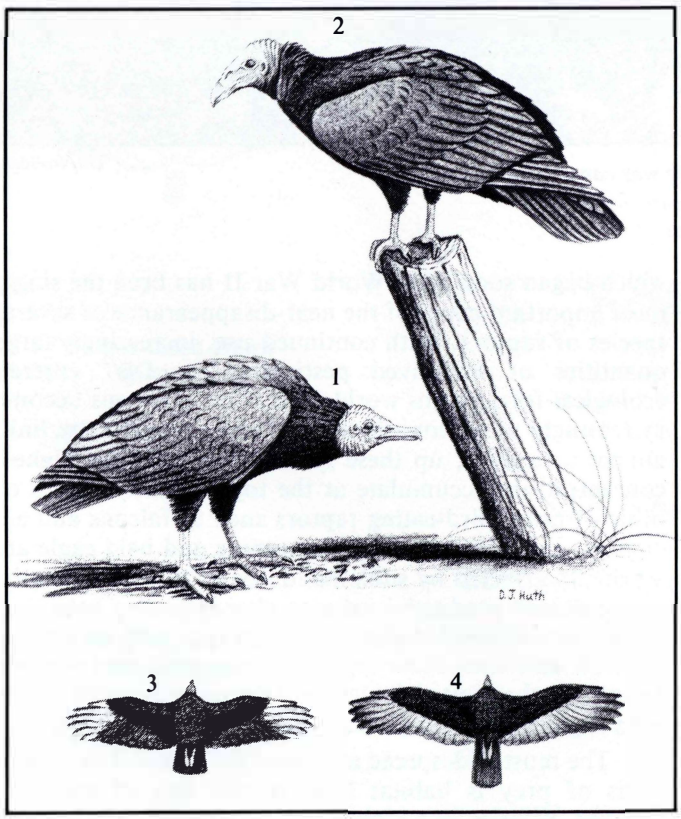
The unrestricted and indiscriminate use of pesticides which began soon after World War II has been the single most important cause of the near-disappearance of several species of raptors. With continued use, increasingly large quantities of long-lived pesticides like DDT entered ecological food chains world-wide. These poisons become increasingly more concentrated as they pass link by link, animal to animal, up these food chains until the highest concentrations accumulate at the top—in fatty tissues of birds of prey. Bird-eating raptors such as falcons and accipiters, and fish-eaters like the osprey and bald eagle are especially affected by sublethal doses of DDT. The results are decreased productivity due to altered nesting behavior, addled or thin-shelled eggs, and even eggs with no shell at all. DDT and some other organochlorine pesticides now are banned in the United States, and some birds, such as the bald eagle, appear to be making a comeback.

The most widespread and constant cause of decline in birds of prey is habitat loss. In the face of marshes, swamps, prairies and forests lost to farming, logging and urban development, many no longer nest in Missouri or nearby states.

Raptor conservation can be achieved in two ways—preventive and constructive. We can protect existing birds by creating better public understanding, by stronger law enforcement and harsher penalties, by discontinuing the use of environmentally unsafe pesticides, and by conserving adequate habitats.

The second method involves management techniques to stimulate population recovery. These include habitat improvement projects in breeding or wintering areas and rehabilitation programs for sick and injured birds. For some critically endangered species like the peregrine falcon, captive breeding projects produce birds to be reintroduced to former haunts. In recent years, it has been found that artificial nest structures may help stimulate significant recoveries in certain raptors. Artificial nest structures are readily used by ospreys in Florida and New England and by prairie falcons in Canada. Barn owls utilize boxes in silos and barns, while American kestrels and screech owls are attracted to nest boxes in many areas.

Recently, the Department of Conservation has been involved in several studies and restoration projects involving birds of prey, including studies of American kestrels and of the wintering habits of bald eagles. Artificial nests have been provided for bald eagles, barn owls and kestrels; young eagles and ospreys are being released in an attempt to restore nesting populations.



1, 3: Black Vultures *2, 4: Turkey Vultures*

The Falconiformes are not closely related and accordingly are separated into three major groups or suborders: New World vultures (Cathartae), falcons (Falcones), and eagles, hawks, kites and the osprey (Accipitres).

New World Vultures

The vultures differ a great deal from other birds of prey. The hind toe is elevated, rudimentary and nonfunctional. The claws are dull and weak. Vultures do not build nests, and they feed their young by regurgitation. Unlike most other birds, vultures have a highly developed sense of smell for aid in locating carrion. Because they lack a syrinx or voice box, vultures are voiceless except for hissing and grunting. Because they feed mainly on dead animals, vultures are relatively immune to virulent toxins such as botulism. Rather than standing on one foot like other birds at roost, vultures squat on the perch like chickens, resting the breast on the feet.

Turkey Vulture

Carthartes aura

Length: 26–32 inches
Wingspread: 68–72 inches
Weight: 2.7–5.5 pounds
Habitat: forests and farmland

Turkey vultures are common in Missouri. They winter in the southern United States and Central America, generally returning in March. Nesting begins in April. They are social when roosting but are solitary nesters. They lay a clutch of two eggs which both adults alternately incubate for 38 to 41 days. The young vultures fledge from the nest in 75 to 80 days. These immature birds can be distinguished from the red-headed adults by the gray or black skin on their featherless heads.

Many people refer to this bird as the buzzard. Its flight profile is highly characteristic, and it is easily recognized as it sails, tilting from side to side, the wings held in a distinct V.

Diet: carrion, offal, dung, occasionally mice, rats, snakes, young birds or eggs.

Black Vulture

Coragyps atratus

Length: 23–27 inches
Wingspread: 54–60 inches
Weight: 2.2–4.4 pounds
Habitat: scattered woodlots and open fields

In subtropical and tropical America, these chunky birds probably are the most numerous birds of prey. They are occasionally seen in southern Missouri. Like turkey vultures, black vultures are migratory, nesting in Missouri and residing here from April through September. Nesting habits are similar to those of turkey vultures, except that black vultures are sociable nesters. Black vultures fly with a series of heavy flaps followed by a labored glide.

Their clutch of two eggs takes 38 to 41 days to incubate, and the young vultures fledge after 70 to 77 days.

Diet: carrion, excrement; rarely, newborn pigs, lambs, calves, domestic chicks, nestling birds and eggs.

Eagles, Hawks, Kites and Osprey

These raptors all possess powerful, clutching talons, which are their main tools for capturing and dispatching prey.

Eagles are the largest raptors in Missouri. There are two species, both of which occur in our state mainly during the winter. In flight, they can be distinguished from hawks by their much greater size, and from the turkey vulture by the horizontal position of their wings, contrasting with the V-shape of the vulture's.

Bald eagles are much more common in Missouri than golden eagles, but where the two species occur together they may be difficult to tell apart. The adult bald eagle's snow-white head and tail are unmistakable, but immature bald eagles are dark-colored during their first three or four years—as are both adult and immature goldens.

The following field marks reliably help separate immature bald eagles from goldens: bald eagles in flight have short, broad tails, extremely broad wings and relatively long necks; goldens have longer, narrower tails, narrower wings and better-proportioned heads; when perched, the feathered legs of golden eagles contrast with the bare legs of bald eagles; and bald eagles' beaks are considerably larger than goldens'.

Brian Toland

The eyes of birds like this golden eagle are the keenest of any living organism, with a resolving power eight times that of humans'.

Bald Eagle

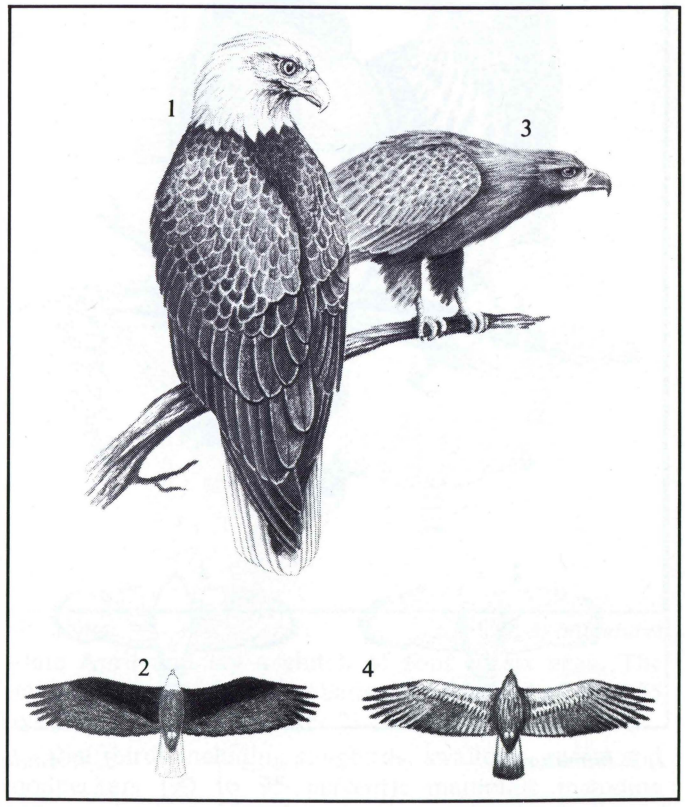
Haliaeetus leucocephalus

Length: 30–42 inches
Wingspread: 72–96 inches
Weight: 8–15 pounds
Habitat: large lakes, rivers and waterfowl refuges

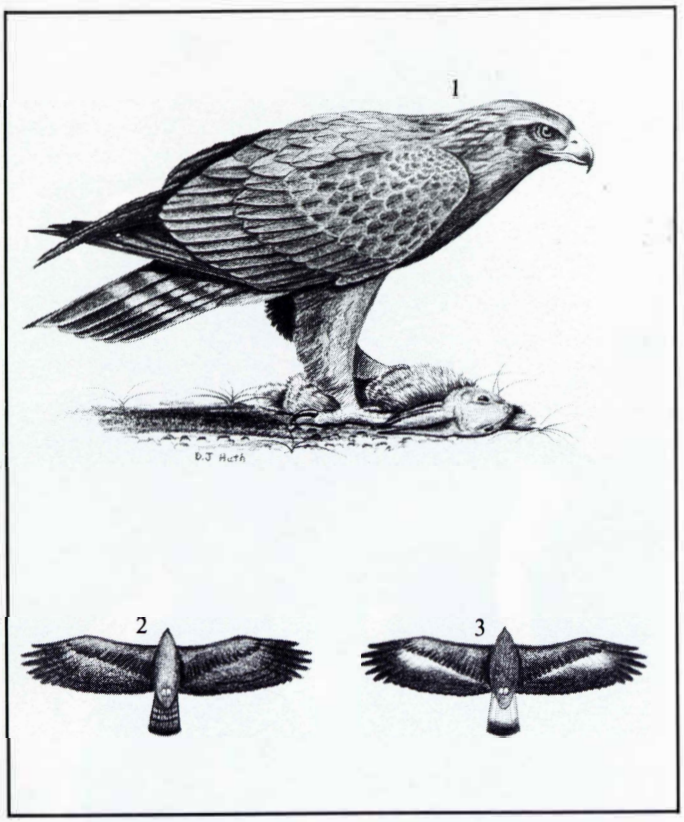
The bald eagle is the only true sea eagle in the Western Hemisphere. It historically nested here, but eagle nesting in Missouri is rare now. Bald eagles are locally common in winter at national wildlife refuges and state waterfowl areas, as well as along the shores of reservoirs, streams and rivers. As a top predator in the food chain, the bald eagle has suffered from pesticide contamination, shooting, human encroachment and habitat loss and is listed as endangered by the U.S. Fish and Wildlife Service.

Bald eagle nests are the largest in the bird world. The birds use the same nest year after year, and the structures may be seven feet across and ten feet deep. Bald eagles lay a clutch of two eggs, which both parents incubate for 35 to 45 days. The young fledge from the nest in 70 to 77 days.

Diet: fish which are scavenged or captured alive (50 to 90 percent), waterfowl and sea birds (10 to 50 percent), mammals such as rabbits, muskrats, foxes and weasels (4 to 5 percent), and invertebrates such as crabs, clams and crayfish (1 percent).



1, 2: Adults *3, 4: Immatures*



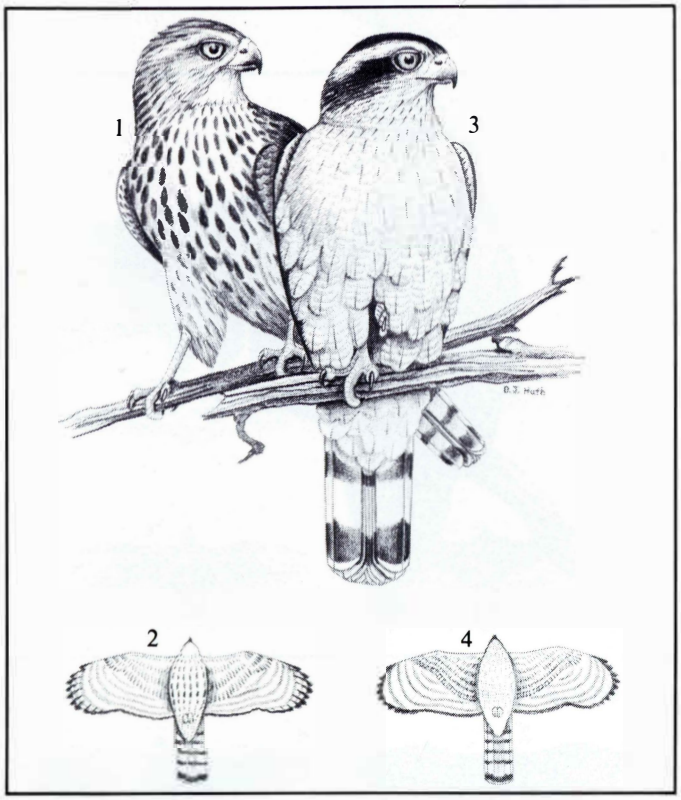
1, 2: Adults *3: Immature*

Golden Eagle
Aquila chrysaetos

Length: 30–40 inches
Wingspread: 72–96 inches
Weight: 7–14 pounds
Habitat: woodlands, river bottoms, prairies and waterfowl areas

The golden eagle is an extremely powerful, regal bird which appears in Missouri during the winter. Golden eagles are common in western states, where they nest, but rare in Missouri.

Diet: Golden eagles have the most catholic diet of any bird of prey, ranging from insects to full-grown deer. Mammals including cottontails, jackrabbits, weasels, cats, opossums, raccoons, porcupines, foxes, coyotes, dogs, skunks, woodchucks, marmots, badgers, bobcats, antelope, deer and some domestic livestock make up 70 to 80 percent of the diet. Birds such as ducks, geese, swans, shorebirds, turkeys, pigeons, great-blue herons, crows, ravens, grouse, turkey vultures, great-horned owls, goshawks, peregrines, red-tailed hawks, Swainson's hawks and others account for 20 to 30 percent.



1, 2: Immatures *3, 4: Adults*

Accipiters are slender hawks with short, rounded wings and long, rudderlike tails. They fly quickly, with several rapid flaps and a short glide. Accipiters generally use two basic modes of hunting: still-hunting from inconspicuous perches and speedy, stealthy flights along paths or around bushes and trees. All accipiters pluck their prey on a favorite perch before consuming it.

Northern Goshawk
Accipiter gentilis

Length: 19–26 inches
Wingspread: 44–48 inches
Weight: 1.8–3.5 pounds
Habitat: forests, woodland edges and farmland

One of the fiercest, most aggressive and persistent pursuers of prey, the goshawk is a rare winter visitor to Missouri. Goshawks are adapted to hunting in woodlands, where their short wings and long tail help them weave in and out of trees with great precision. This hawk is capable of tremendous short bursts of speed when chasing its favorite prey, the grouse. Goshawks can be distinguished from Cooper's hawks by their larger size and white eyebrow.

Diet: birds including grouse, pheasants, ducks, crows, pigeons, songbirds, woodcock, smaller hawks and owls, woodpeckers and snipe (40 to 60 percent); mammals including mice, rats, chipmunks, squirrels, weasels, rabbits and hares (40 to 60 percent).

Cooper's Hawk

Accipiter cooperii

Length: 15–18 inches
Wingspread: 28–38 inches
Weight: 10–21 ounces
Habitat: woodlands interrupted by fields and meadows

The Cooper's hawk is a crow-sized forest hawk, smaller than the goshawk and larger than the sharp-shinned hawk. They are uncommon permanent residents in Missouri and are included on the state endangered species list. Cooper's hawks have suffered severe declines in much of eastern North America, attributable to organochlorine pesticides and forest habitat loss.

Because of the Cooper's hawk's secretive nature during nesting, little is known about the breeding status and productivity of these hawks in Missouri. Cooper's hawks or blue darters as they are sometimes called, begin nesting in mid-April. The preferred nesting habitat is mixed deciduous–coniferous forest with interspersed open areas. The nests usually are built near natural or man-made clearings and near a creek or lake.

A clutch of four to six eggs is laid and incubated by the female for 35 or 36 days. The young fledge from the nest in 30 to 35 days.

Diet: mammals including chipmunks, tree squirrels, rats, mice, rabbits, flying squirrels (15 to 25 percent); birds including smaller hawks and owls, songbirds, quail, grouse, woodpeckers, cuckoos, pigeons (70 to 85 percent); reptiles and amphibians including snakes, lizards and frogs (5 percent); insects such as beetles and grasshoppers (2 percent).

Sharp-shinned Hawk

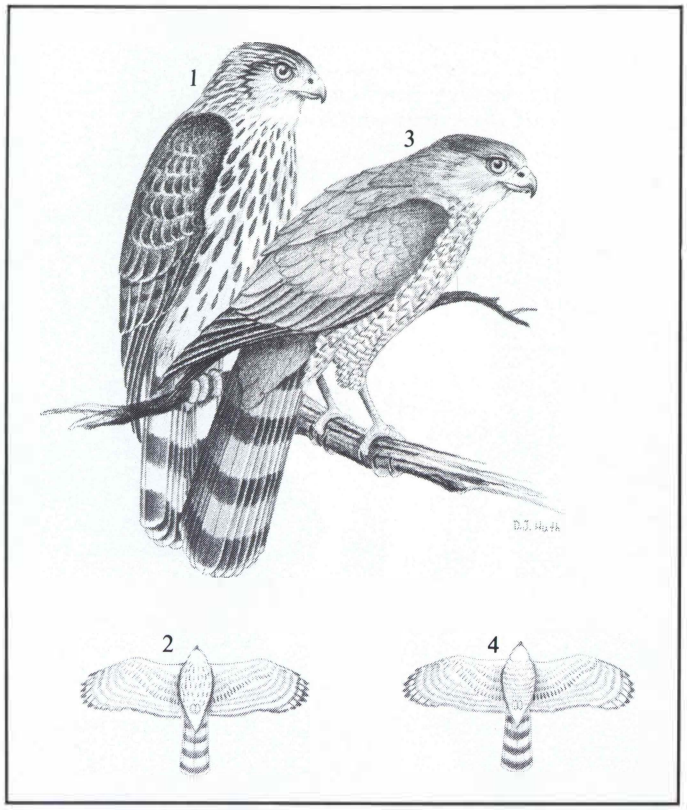
Accipiter striatus

Length: 10–14 inches
Wingspread: 21–27 inches
Weight: 3.5–8 ounces
Habitat: forests and farmland

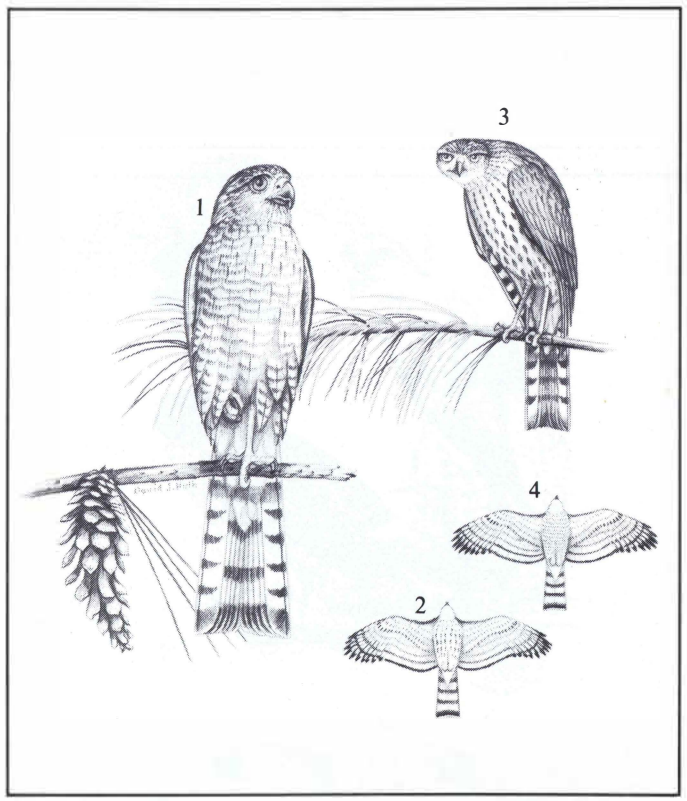
The sharp-shinned hawk, sometimes referred to as little blue darter, is a scaled-down version of the Cooper's hawk. In flight, sharp-shins can be distinguished from Cooper's in the following ways: the sharp-shinned hawk has a distinctly squared or notched tail which contrasts with the Cooper's hawk's rounded tail; the sharp-shins' flight is much more buoyant and less direct than that of the Cooper's hawk, owing to its significantly lighter wing-loading; when perched, Cooper's hawks exhibit distinct black caps while the head and neck of sharp-shinned hawks are uniformly slate-gray.

Although this little hawk historically nested in significant numbers within our state, there have been few documented successful nestings in recent years. Though sharp-shinned hawks are permanent Missouri residents and are seen fairly frequently, they have suffered general population declines in eastern North America. They parallel the Cooper's hawk's status on the state but not the federal endangered species list, as well as on the Audubon Society's Blue List. Contamination by organochlorine pesticides as well as intensive forest management are responsible for the sharp-shinned hawk's current status.

These secretive birds breed in coniferous forests where nests usually are placed in trees with dense foliage below a well-developed canopy. Sharp-shins initiate nesting in mid-to-late April and lay a clutch of four to six eggs. The female does most of the incubating for a period of 34 or 35 days. The young fledge after 21 to 27 days.



1, 2: Immatures *3, 4: Adults*



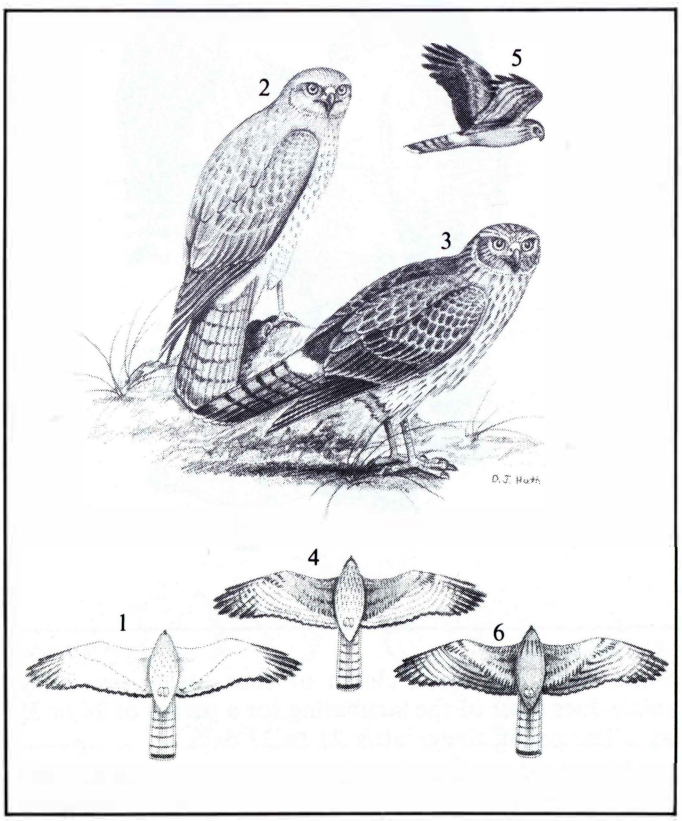
1, 4: Adults *2, 3: Immatures*

Diet: birds including songbirds, swallows, swifts and woodpeckers (90 to 95 percent); mammals including shrews, bats, and mice (2 to 6 percent); insects including dragonflies and grasshoppers (1 to 4 percent).

Kites are seldom seen perching; they capture most of their prey—insects and small birds—in flight.

Jim Rathert

Harriers are slim hawks with long wings and long, broad tails. Their flight is low and slow as they continuously quarter back and forth in open country.



1, 2: Males *3, 4: Females* *5, 6: Immatures*

Northern Harrier or **Marsh Hawk**

Circus cyaneus

Length: 17–24 inches
Wingspread: 43–53 inches
Weight: 10–21 ounces
Habitat: open grasslands and marshes

The northern harrier is a slender-bodied hawk with long wings and tail, long, slender legs and a white rump. Males are pearl-gray and females brownish. These birds forage on the wing much of the day, systematically quartering fields and marshes just above the vegetation. Marsh hawks roost communally outside the nesting season, as many as 30 together.

The northern harrier is one of the few hawks that nest on the ground. Owing to extensive wetland drainage, haying and destruction of native prairies and meadows, these birds nest only infrequently in Missouri. The harrier is on the National Audubon Society's Blue List but is included on Missouri's endangered species list. Outside the nesting season, however, marsh hawks are common residents in our state.

The northern harrier lays a clutch of four to seven eggs in mid-May; these are incubated for 25 to 30 days, mainly by the female. The young fledge in 31 to 38 days. Males sometimes nest with two or three females at the same time, especially during years when food is abundant.

Diet: mammals including mice, rats, shrews, pocket gophers, squirrels, cottontails (60 to 80 percent); birds including songbirds, woodcock, rails, quail, bitterns and smaller raptors (15 to 30 percent); reptiles and amphibians including snakes, lizards, frogs and toads (10 to 40 percent); invertebrates including crayfish and insects (5 to 15 percent).

Buteos are stocky hawks with broad wings and broad, rounded tails which are fanned during their frequent soaring. They also habitually perch conspicuously on dead trees, power poles or fence posts.

Red-tailed Hawk
Buteo jamaicensis

Length: 18–25 inches
Wingspread: 48–58 inches
Weight: 1.8–3.6 pounds
Habitat: forests interspersed with open fields and farmland

The red-tailed hawk is a powerful, husky hawk; its loud, defiant scream and frequent soaring are familiar. Its aggressiveness and adaptability have made it the most numerous and successful bird of prey in North America. In Missouri, red-tails prefer mixed forest and farmlands, but they successfully inhabit any habitat with relatively sturdy, tall trees for nesting, red cedars or pines for roosting and readily available prey populations.

Red-tails dominate all other Missouri hawks both in winter and during nesting. During winter they often steal prey from northern harriers or displace northern rough-legged hawks from hunting perches. During nesting, red-tails often pre-empt nest sites from red-shouldered and broad-winged hawks while occasionally adding these and smaller hawks and owls to their menu.

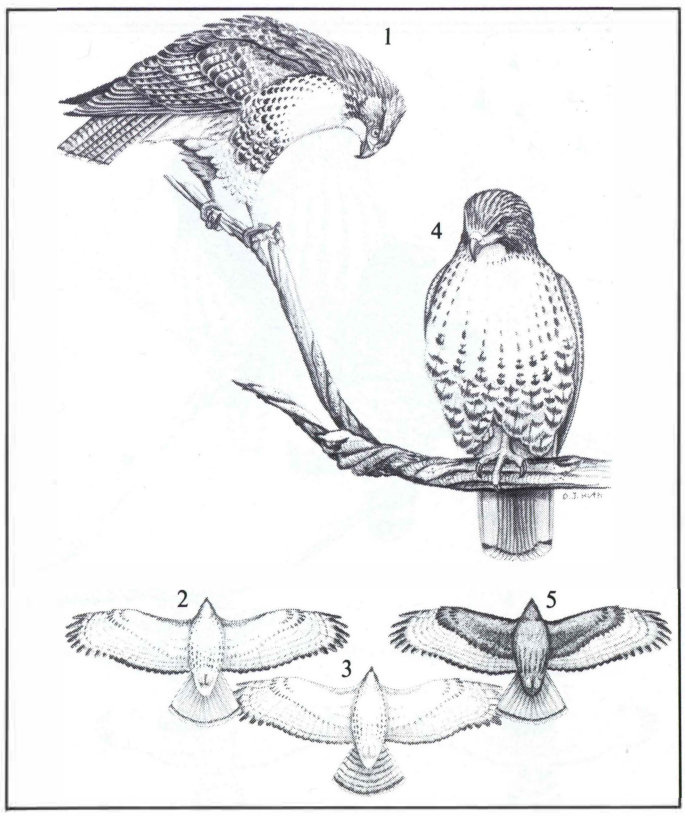
The red-tail nests the earliest of the Missouri Falconiformes, laying a clutch of one to three eggs in mid-March. The female does most of the incubating until the eggs hatch in 28 to 32 days. Young red-tails fledge from the nest in 44 to 48 days.

Red-tailed hawks probably take a greater variety of prey than any other American raptor except the golden eagle. Usually, whatever animal is most abundant and most easily caught in a given location is likely to be part of its diet.

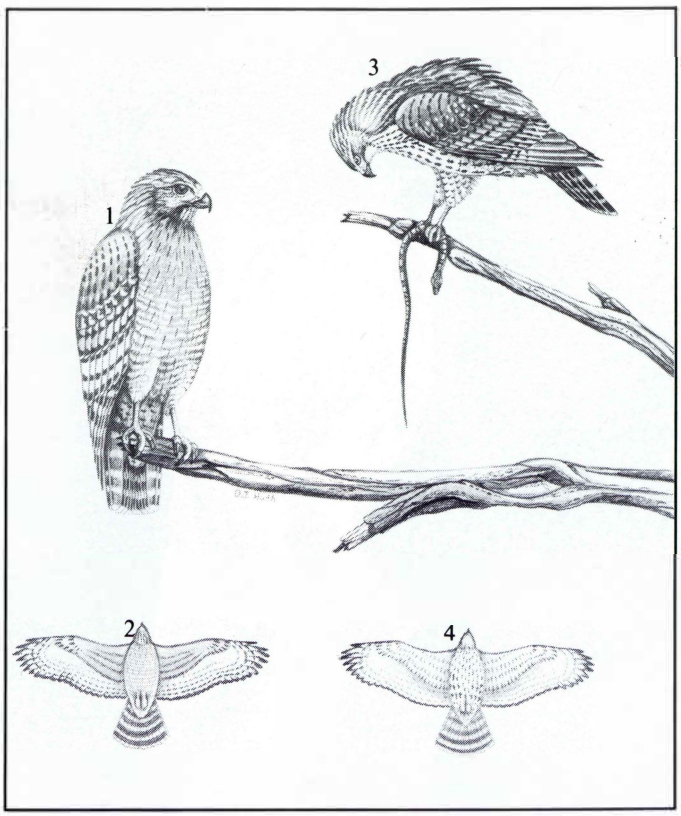
Diet: mammals including mice, rats, moles, shrews, squirrels, pocket gophers, cottontails, jackrabbits, opossums, muskrats, weasels, house cats (70 to 85 percent); birds including grouse, ducks, coots, pigeons, quail, rails, gallinules, doves, woodpeckers, songbirds, pheasants, crows and rarely poultry (10 to 15 percent); reptiles and amphibians including rattlesnakes, copperheads, water snakes, black rat snakes, lizards and frogs (3 to 10 percent); fish (.5 percent); invertebrates including crayfish, grasshoppers, preying mantis and worms (1 to 5 percent).

Jim Rathert

Red-tailed hawks are adaptable to habitat and versatile in their diet, making them the most abundant hawk in North America.



1, 3: Immatures *2, 4: Adults* *5: Adult (dark phase)*



1, 2: Adults *3, 4: Immatures*

Red-shouldered Hawk

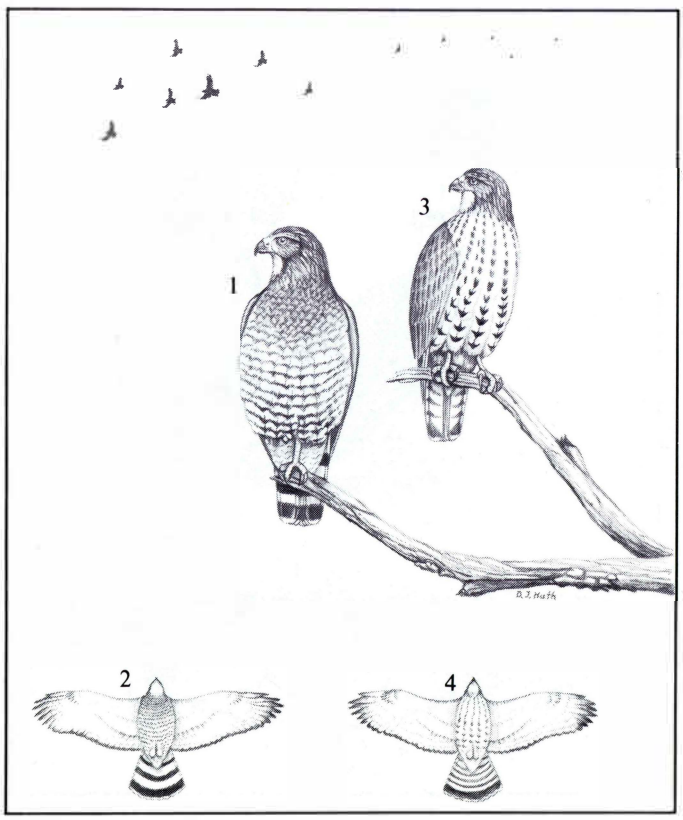
Buteo lineatus

Length: 17–23 inches
Wingspread: 34–50 inches
Weight: 1–2.3 pounds
Habitat: lowland hardwood forests and wooded streams

The red-shouldered hawk is one of the most beautifully marked raptors in North America. Adults have a rufous breast and shoulders, four or five equal-width white tail bars, and much black and white barring on the flight feathers. This handsome hawk is a locally common, permanent resident in Missouri, often seen along well-timbered Ozark rivers and the wet woodlands of Mingo National Wildlife Refuge and Duck Creek Wildlife Management Area. Red-shoulders are on the National Audubon Society's Blue List and on the Missouri rare species list. Loss of habitat, persecution by man and incompatability with the larger red-tailed hawk are important limiting factors to Missouri's red-shouldered hawks.

In early spring, red-shoulders become extremely conspicuous and noisy as they soar about, screaming. The nest is a large stick structure similar to that built by red-tailed hawks but less sturdy and built without preference for commanding views. A clutch of two to four eggs is laid in late March and incubated for 26 to 28 days. The young hawks fledge after 35 to 42 days.

Diet: mammals including mice, rats, chipmunks, squirrels and moles (40 to 60 percent); birds including songbirds, woodpeckers and cuckoos (8 to 12 percent); reptiles and amphibians including frogs, toads and snakes (30 to 40 percent); invertebrates including crayfish and insects (10 to 20 percent).



1, 2: Adults *3, 4: Immatures*

Broad-winged Hawk

Buteo platypterus

Length: 14–18 inches
Wingspread: 32–39 inches
Weight: 14–22 ounces
Habitat: forests, especially along rivers and creeks

The broad-winged hawk is a relatively sluggish, stocky little buteo, easily recognized by the two wide, white bars on the tail and the wailing whistle *su-eeee-oh*. The broadwing is a highly migratory species; as many as 1,000 individuals have been sighted at once passing over the Jefferson City and St. Louis areas. These spectacular migrations are best seen in mid-morning on a bright day following the passage of a cold front between September 15 and 25. In Missouri, broad-winged hawks are Missouri residents from April through September, though they are relatively uncommon nesters. In May, broad-wings lay two to four eggs which both sexes incubate for about 28 days. The young hawks fledge in 28 to 32 days.

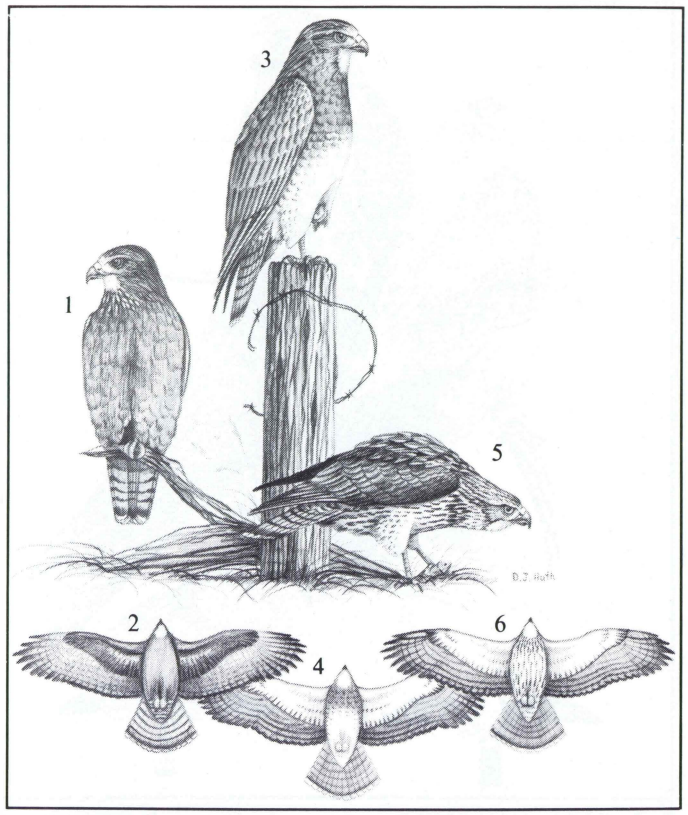
Diet: mammals including mice, rats, bats and cottontails (30 to 50 percent); birds including songbirds, cuckoos and woodpeckers (5 to 15 percent); reptiles and amphibians including frogs, snakes, turtles, lizards (20 to 40 percent); invertebrates including crayfish and insects (10 to 50 percent).

Swainson's Hawk
Buteo swainsonii

Length: 18–23 inches
Wingspread: 48–56 inches
Weight: 1.8–2.9 pounds
Habitat: plains and prairies

The Swainson's is a hawk of the western plains which migrates through Missouri in small numbers in spring and fall. It is rather longer-winged and lankier than other Missouri buteos. In flight, it is easily distinguished from other soaring hawks by the dark-brown flight feathers which contrast with the white wing lining. Like the red-shouldered hawk, the feet of Swainson's hawks are relatively weaker than those of other similar-sized hawks. Thus it preys mainly upon small animals.

Diet: mammals including mice, rats, gophers and ground squirrels (60 to 70 percent); birds including songbirds, shorebirds and quail (10 to 15 percent); reptiles and amphibians including snakes and lizards (3 to 10 percent); insects (5 to 30 percent).



1, 2: Adults (dark phase) 3, 4: Adults (normal) 5, 6: Immatures

Northern Rough-legged Hawk
Buteo lagopus

Length: 19–24 inches
Wingspread: 50–56 inches
Weight: 1.8–3.1 pounds
Habitat: open farmland, prairies and meadows

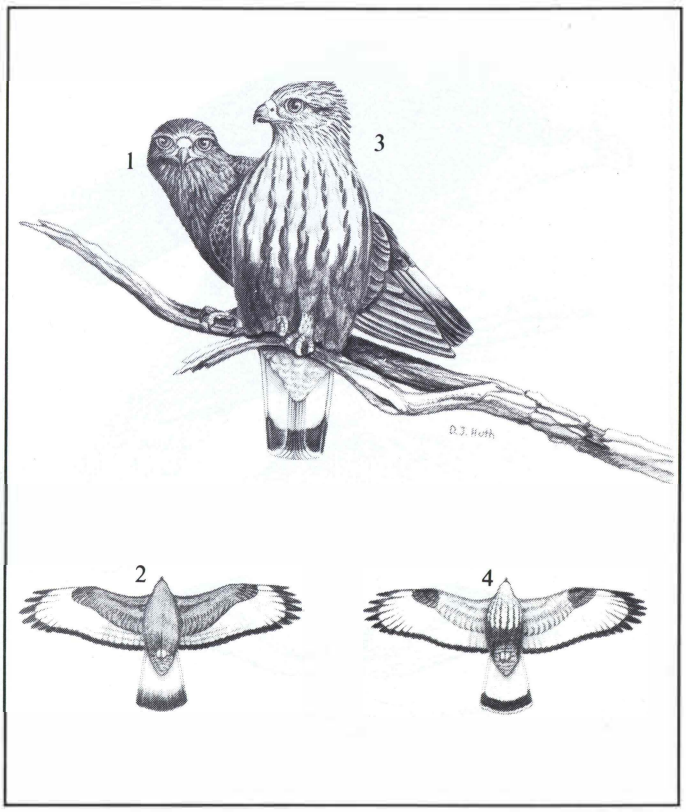
The northern rough-legged hawk is a bird of the arctic and subarctic open tundras and mountainsides during the nesting season, but it migrates south in winter, residing in Missouri from October through March. The extent and intensity of the migration of rough-legs depends upon prey availability. Because of this, the rough-leg is quite common in Missouri during some years and relatively uncommon in others.

Rough-legs often occur in the same open meadows and fields that Missouri's red-tailed hawks prefer in winter. Rough-legs can be identified by the pale head and neck, white tail with a broad, black band at the tip, and broad, dark-brown chest band. In flight, another diagnostic field mark is the white underwings with large, blackish elbow patches.

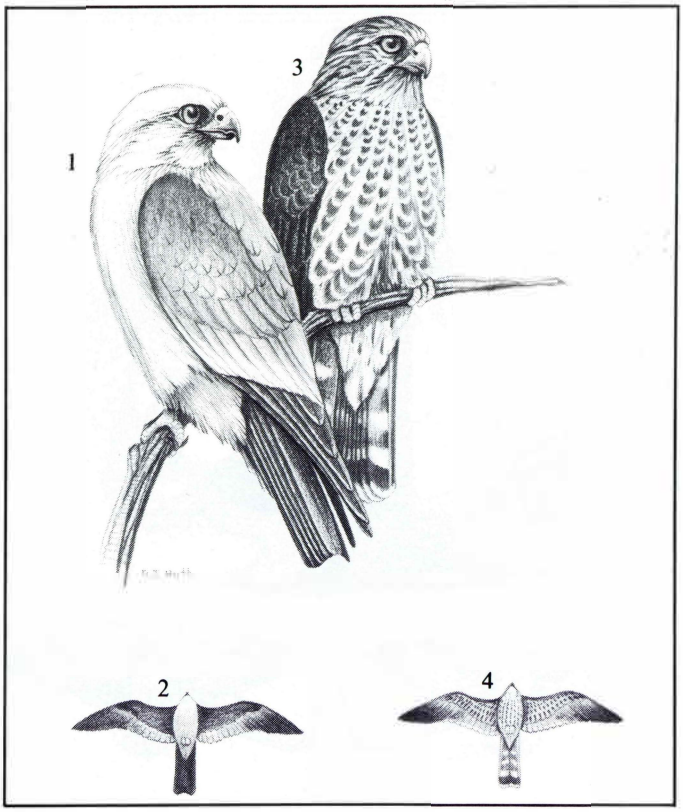
Rough-legged hawks are graceful in flight when they soar or use wind currents to hover or quarter to and fro just above the ground.

The feet are strong but small for the bird's body size. This is an adaptation to feeding almost entirely on small rodents.

Diet: mammals including mice, shrews, rats, gophers and ground squirrels (90 to 98 percent); birds including songbirds, rails and quail (2 to 8 percent).



1, 2: Adults (dark phase) 3, 4: Adults (normal)



1, 2: Adults *3, 4: Immatures*

Mississippi Kite
Ictinia mississippiensis

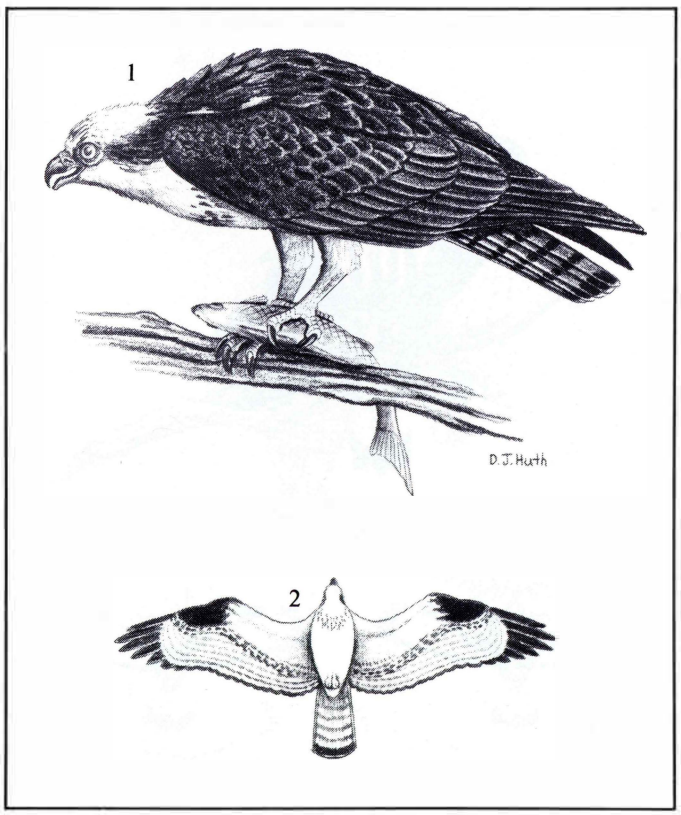
Length: 13–16 inches
Wingspread: 35–40 inches
Weight: 7–13 ounces
Habitat: scattered woods and brushy fields near water

The Mississippi kite is a medium-sized, falcon-shaped hawk which is uniformly gray with black wing-tips and a black, unbarred tail. These kites are most often seen on the wing; their flight is buoyant, graceful and smooth, resembling a medium-sized gull.

Mississippi kites are migratory but occur in Missouri from April through September. They are rare in our state, but do nest in low numbers, mainly in southeastern Missouri along the Mississippi River. Two eggs are laid in April and incubated by both sexes for 30 to 32 days. Young kites fledge at 33 to 35 days of age.

These raptors specialize in capturing and eating insects in flight.

Diet: rodents including mice, shrews and moles; reptiles and amphibians including lizards, frogs and small snakes; birds, mostly songbirds (10 percent); invertebrates including crayfish, locusts, dragonflies, grasshoppers, beetles, cicadas, crickets and worms (90 to 100 percent).



1, 2: Adults

Osprey
Pandion haliaetus

Length: 21–25 inches
Wingspread: 58–70 inches
Weight: 2.5–4.3 pounds
Habitat: lakes and rivers

Ospreys are large hawks, mid-way in size between eagles and big buteo hawks. They lack the bony shields over the eyes, have a reversible outer toe, sharp scales on the toes and nostrils that can be closed for plunging into water in pursuit of fish.

Sometimes called fish hawk, the osprey is an uncommon migrant in Missouri in spring and fall. It once nested in Missouri, but no confirmed nestings have been reported in recent years. Ospreys have declined in numbers due to organochlorine pesticides and loss of nesting habitat. They are Blue-Listed by the National Audubon Society and included on Missouri's endangered species list.

Ospreys cannot be confused with any other raptor; they are mostly white underneath, with brown speckles on the breast, brownish-black wrist marks on the wings, brown on the back, with a white head and thick, brown eye stripes. In flight it commonly soars or hovers with a distinct crook in the elbows of the wings.

Ospreys are highly adaptable to artificial nest structures, nesting commonly on old duck blinds, power poles, channel markers and other man-made structures. Nesting platforms erected specifically for these birds have proven to be a successful management technique. In May, three eggs are laid in huge stick nests and incubated by both sexes for 32 or 33 days. The young fledge in 51 to 59 days.

Diet: fish (98 percent), birds and rodents (2 percent).

Falcons

Falcons are streamlined birds with pointed wings and moderately long tails. They are the swiftest birds, capable of speeds of 150 to 200 mph during vertical dives or stoops.

Peregrine Falcon

Falco peregrinus

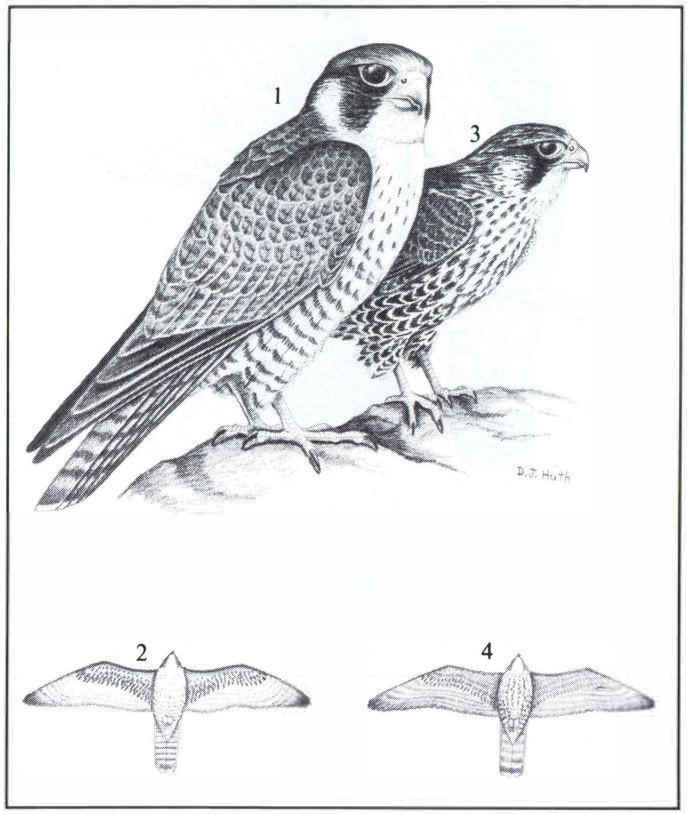
Length: 15–21 inches
Wingspread: 38–45 inches
Weight: 1.1–3.4 pounds
Habitat: open areas, especially along rivers and floodplains

The name *peregrine* means "wanderer" or "migrator" and this large falcon has, in fact, the most extensive natural distribution of any bird in the world. Because it inhabits every continent except Antarctica and is found on many oceanic islands, the peregrine could be called the world's most successful bird. In the field, peregrines are slaty or blue-gray above and white or pinkish below, barred black in adults and streaked in immatures.

Though they historically nested in Missouri through the 1800s, the peregrine has been extirpated as a breeder throughout the eastern United States, including Missouri. Causes include contamination from pesticides (notably DDT), human disturbances at nest sites, shooting and such land-use as agriculture, wetland drainage, mining, road construction and recreation. The peregrine is included on both federal and state endangered species lists. It remains a rare migrant visitor to Missouri in spring and fall.

Peregrines capture the majority of their prey in mid-air, usually in a high-speed, vertical dive.

Diet: birds including shorebirds, ducks, geese, pigeons, doves, woodpeckers, songbirds, herons, rails, terns, gulls, sea birds and grebes (95 to 100 percent); mammals including mice and ground squirrels (5 percent).



1, 2: Adults *3, 4: Immatures*

Prairie Falcon

Falco mexicanus

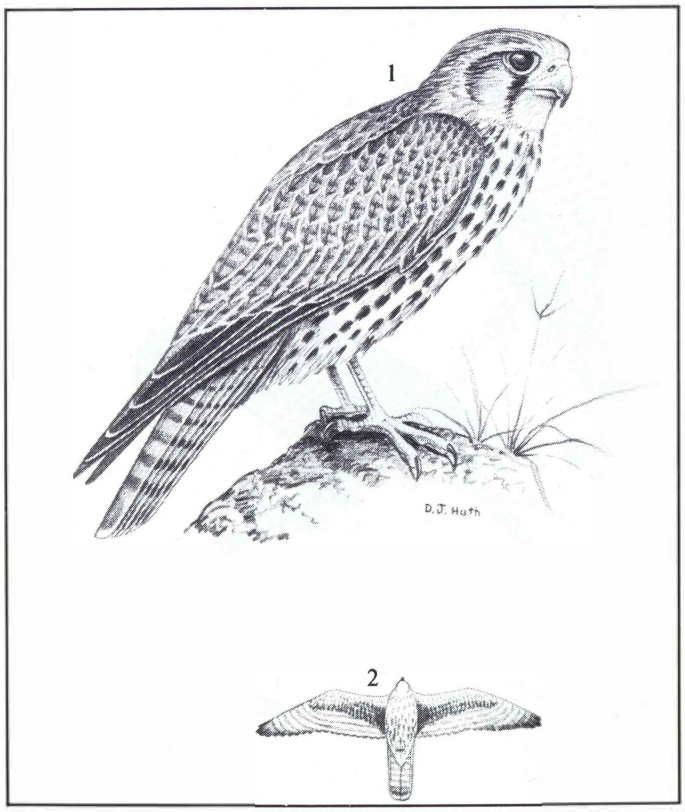
Length: 16–19 inches
Wingspread: 38–43 inches
Weight: 1.1–2.2 pounds
Habitat: river floodplains and open farmland

This large falcon inhabits the western United States and southern Canada but appears infrequently in Missouri during the winter. Prairie falcons can be distinguished from the similar-sized peregrines by their lighter build, brown back and blackish triangles visible at the base of the underwings during flight.

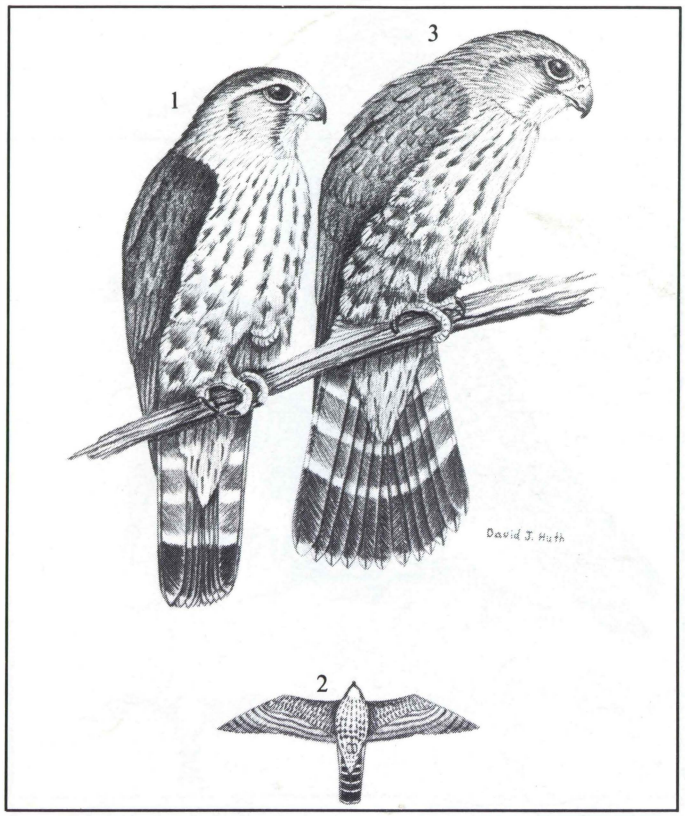
Although listed as threatened by the U.S. Fish and Wildlife Service, prairie falcons appear to be holding their own in most states. Reasons for some local declines include contamination by pesticides and mercury, lack of suitable nest ledges in cliffs and habitat loss, especially due to monotypic grain-farming.

Prairie falcons are aggressive, irascible, excitable birds which harass larger ravens, hawks and eagles unmercifully. They capture their prey on or near the ground after a long, shallow dive.

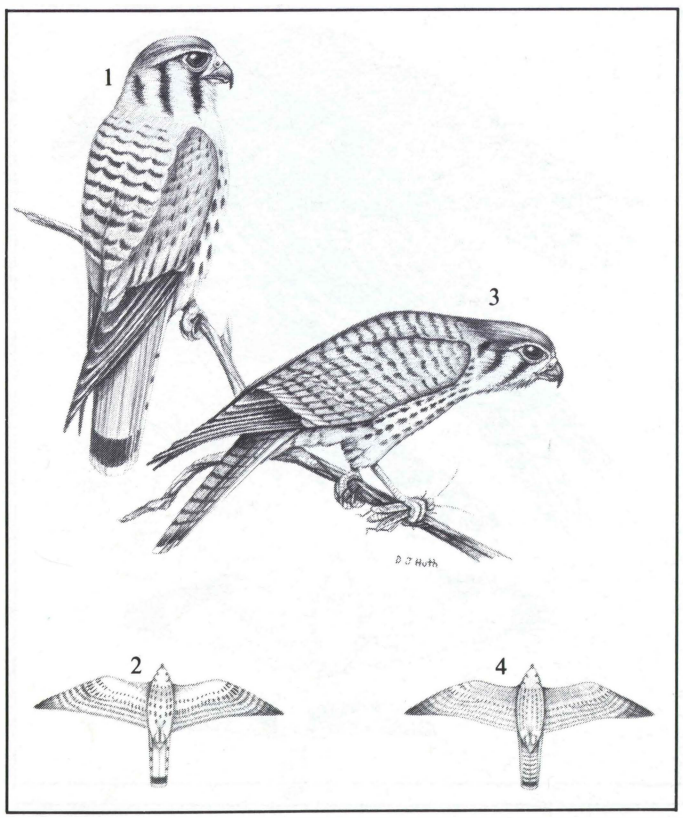
Diet: mammals including ground squirrels, mice, rats and gophers (40 to 60 percent); birds including doves, pigeons, songbirds, grouse, quail and swifts (40 to 60 percent).



1: Immature *2: Adult*



1, 2: Males *3: Female*



1, 2: Males *3, 4: Females*

Merlin

Falco columbarius

Length: 10–13 inches
Wingspread: 22–26 inches
Weight: 5–10 ounces
Habitat: open areas, especially along major river floodplains

The merlin, sometimes called pigeon hawk, is a small, dashing, fearless falcon that nests in the boreal forests, marshlands, prairies and prairie parklands of North America. Merlins do not nest in Missouri but do pass through the state in small numbers in spring and fall. Merlins have suffered severe declines in some areas because of pesticides and agricultural expansion and are Blue-Listed by the National Audubon Society.

Males are slate-blue on the back and buffy with cinnamon streaks underneath; females are brown on the back with buffy brown streaks underneath.

Merlins commonly hunt by flying low over the ground in a veering and erratic course, with rapidly beating wings and short glides.

Diet: mammals including mice and bats (1 percent); birds including teal, shorebirds, songbirds, woodpeckers, rails and nighthawks (80 to 100 percent); insects (5 to 50 percent).

American Kestrel

Falco sparverius

Length: 9–12 inches
Wingspread: 20–24 inches
Weight: 3.2–6.4 ounces
Habitat: farmland, suburban and urban areas

The American kestrel is the smallest and most colorful of North American Falconiformes. Males have a bright rufous back with some black bars, a bright rufous tail and bluish-gray wings; females are brown, barred with black on back and tail, and buff with brownish streaks underneath.

Kestrels, commonly called sparrow hawks, are unique in that they are the only North American falcon or hawk to nest in cavities—not only in natural cavities and woodpecker holes but in the eaves of buildings and barns and in nest boxes as well.

Kestrels are common residents of Missouri throughout the year. Nesting usually begins in mid-March, and a clutch of four to six eggs is laid in early April. The female does most of the incubating for 28 to 30 days, while the male hunts for her. Young kestrels fledge from the nest after 28 to 30 days.

Because many old-growth trees and snags are being cut or cleared, and with the conversion of habitat to monotypic grain farms, these beautiful falcons have declined in some areas. They are Blue-Listed by the National Audubon Society.

Kestrels typically hunt from a conspicuous perch or hover like miniature helicopters. The flight is bouyant, graceful and rapid, quite like a large swallow.

Diet: mammals including bats, mice, shrews, rats, gophers, young ground squirrels and young cottontails (70 percent); birds, mainly house sparrows (10 percent); invertebrates including worms, crickets, grasshoppers, beetles, dragonflies and butterflies (20 percent); reptiles and amphibians (1 percent). □